

REMARKS

Claims 1-27 and 32-38 are presently pending in the application. Claims 6 and 36 have been amended for purposes of clarification and not for purposes of overcoming the prior art.

In the Office Action dated August 7, 2008 claims 1-27 and 32-38 were rejected. More specifically, the status of the application in light of this Office Action is as follows:

- (A) Claims 1-15 and 32-36 were objected to.
- (B) Claims 4, 9 and 14 were rejected under 35 U.S.C. § 112.
- (C) Claims 2 and 38 stand rejected under 35 U.S.C. § 103(a) over Paradiso in view of US Publication No. 2004/0250819 to Blair (Blair).
- (D) Claims 6, 8-11, 13-17 stand rejected under 35 U.S.C. § 103(a) over Paradiso in view of US Publication No. 2001/0040507 to Eckstein (Eckstein).
- (E) Claims 7, 12 and 18 stand rejected under 35 U.S.C. § 103(a) over Paradiso in view of Eckstein and further in view of Blair.
- (F) Claims 19-20 and 23-24 stand rejected under 35 U.S.C. § 103(a) over Paradiso in view of US Publication No. 2003/0163037 to Bladen (Bladen).
- (G) Claims 21-22, 25 and 27 stand rejected under 35 U.S.C. § 103(a) over Paradiso in view of Bladen and further in view of US Patent No. 6,073,043 to Schneider (Schneider).
- (H) Claims 32-34 and 36 stand rejected under 35 U.S.C. § 103(a) over Paradiso in view of US Patent No. 5,491,715 to Flaxl (Flaxl).

A. Response to Objections

Claims 1-15 and 32-36 were objected to due to informalities. Claims 6 and 36 have been amended for purposes of correcting informalities and not for purposes of overcoming the prior art. Accordingly, applicants respectfully request these objections be withdrawn.

B. Response to 35 U.S.C. § 112 Rejections

Applicants respectfully accept the Examiner's broadest reasonable interpretation to the claimed, "elements that have frequencies that are uniformly spaced apart" for purposes of searching the claimed invention.

C. Response to Claim Rejections Under Section 102(b)

Claims 1-15 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Paradiso. Applicants respectfully submit that each of the pending claims includes specific features that are neither disclosed nor suggested by the Paradiso reference. For example, these claims include features of locating a marker having a marker resonance frequency including for example, applying an excitation at one of a set of frequencies to said marker using an excitation source. Further features include receiving a set of plurality of inputs indicative of a sensed magnetic flux induced by said marker in response to said excitation at said one of a set of frequencies and iteratively repeating in said set of frequencies. Still further features relate to identifying said marker resonant frequency based upon the multiple sets of plurality of inputs, and adjusting said excitation source to provide further excitation at said marker resonant frequency. Yet another feature includes receiving a resonance set of plurality of inputs indicative of a sensed magnetic flux induced by said marker in response to said excitation at said marker resonant frequency, and analyzing said resonance set of plurality of inputs to determine said location of said marker.

These claims further include a receiver that includes a ring time control processor that allows the adjustment of the interval of an observation interval. As discussed in greater detail below, Paradiso does not disclose or suggest, among other things, these features of the claims. Accordingly, this reference cannot support Section 102 rejection of the pending claims for at least this reason, and the rejections should be withdrawn.

1. Claims 1, 3-5, 35 and 37 Are Allowable Over Paradiso Because This Reference Does Not Disclose All of the Claim Features

Claims 1, 3-5, 35 and 37 are patentable over Paradiso under Section 102(b) because this reference fails to disclose several claimed features. For example, independent claim 1 and dependent claims thereof claim a method of locating a marker including *inter alia* adjusting an excitation source to provide further excitation at said marker resonant frequency and receiving a resonance set of plurality of inputs indicative of a sensed magnetic flux induced by said marker in response to the excitation at the marker resonant frequency. As will be discussed subsequently, Paradiso does not disclose any of these claim features, and thus does not anticipate claims 1, 3-5, 35 and 37.

2. Independent Claim 1 Is Directed to a Method of Locating a Marker that Includes, *Inter Alia*, Adjusting an Excitation Source

Independent claim 1 recites a method of locating a marker that includes, *inter alia*, identifying a marker resonant frequency based upon multiple sets of plurality of inputs, adjusting an excitation source to provide further excitation at the marker resonant frequency and receiving a resonance set of plurality of inputs indicative of a sensed magnetic flux induced by said marker in response to said excitation at said marker resonant frequency. As disclosed in the specification, manufacturing variances

interfere with providing markers having an accurately predictable resonant frequency (Specification, page 15). As claimed, the tunable receiver identifies the resonant frequency of the marker and provides that information to the excitation source. The excitation source can then provide an exciting pulse at a frequency that is closely matched to the resonant frequency of the marker. In this manner, better performance can be obtained by the system. Several methods for identifying a marker resonant frequency are disclosed in the specification, including for example, an iterative manner, by choosing a  $\Delta F$  frequency spacing as a fixed percentage of bandwidth, interpolating a resultant response, and by using a sparse set of excitation frequencies to search a frequency range. (Specification, page 15-17)

Furthermore, the receiver is adaptable to work in coordination with the excitation source to tune the system to the specific characteristics of the marker. (Specification, page 15) Specifically, the excitation source has an adjustable frequency that can be tuned in accordance with analysis made by the receiver. (Specification, page 15) Thus, the determination of the resonant frequency of the marker may be done in an iterative manner to further include adjusting said excitation source to provide further excitation at said marker resonant frequency. (Specification, page 15)

3. Paradiso Is Directed to Devices and Methods to Track Multiple-Axis Passive Resonant Structures

Paradiso discloses a device and method capable of magnetic coupling which is tracked using one or more pairs of coils oriented such that, when the coils are energized, a substantially uniform magnetic field is created in a region between the coils. (Col. 1, Ins. 55-58) The field magnetically couples into any appropriately aligned structures located in the region between the coils. (Col. 1, Ins. 58-60) As such, Paradiso discloses a continuous wave excitation of constant amplitude and frequency.

4. Claims 1, 3-5, 35 and 37 Are Allowable Over Paradiso Because This Reference Does Not Disclose a Method of Locating a Marker including *Inter Alia* Adjusting an Excitation Source

Claims 1, 3-5, 35 and 37 are patentable over Paradiso under Section 102(b) because this reference fails to disclose, teach or suggest a method for locating a marker having a marker resonant frequency including adjusting an excitation source. As described previously, independent claim 1 recites a method of locating a marker that includes, *inter alia*, adjusting the excitation source to provide further excitation at the marker resonant frequency and receiving a resonance set of plurality of inputs indicative of a sensed magnetic flux induced by the marker in response to the excitation at the marker resonant frequency. Paradiso does not disclose, teach, or suggest adjusting the excitation source to provide further excitation at the marker resonant frequency and receiving a resonance set of plurality of inputs indicative of a sensed magnetic flux induced by the marker in response to the excitation at the marker resonant frequency. Instead, Paradiso teaches away from going back to determine the resonant frequency of the marker by disclosing a magnetic resonance structure that provides continuous wave excitation of constant amplitude and frequency. Furthermore, the applicant respectfully notes that the Examiner fails to identify these claimed elements in the Paradiso reference, rather, the Examiner simply notes that "Paradiso goes on..." (Office Action, page 3) but fails to identify any teaching or disclosure in Paradiso directed to adjusting the excitation source to provide further excitation at the marker resonant frequency or receiving a resonance set of inputs in response. Thus, claim 1 and its dependent claims can not be anticipated by Paradiso and for at least the foregoing reasons, the rejection of these claims should be withdrawn.

D. Response to Claim Rejections Under Section 103

Claims 6, 8-11, 13-17 stand rejected over Paradiso in view of Eckstein; claims 7, 12 and 18 stand rejected over Paradiso in view of Eckstein and further in view of Blair;

claims 19-20 and 23-24 stand rejected over Paradiso in view of Bladen; claims 21-22, 25 and 27 stand rejected over Paradiso in view of Bladen and further in view of Schneider; claims 32-34 and 36 stand rejected over Paradiso in view of Flaxl. Applicants note that in each of these Section 103 rejections, the Examiner relies on Paradiso as a primary reference.

1. Independent Claims 6 and 11 Are Directed to a Method and Apparatus for Determining a Marker Resonant Frequency that Utilize a Resonant Frequency and Ring Time Control Processor

Independent claim 6 and dependent claims thereof recite a method of determining a marker resonant frequency associated with a patient, including applying an excitation at one frequency, receiving a set of plurality of inputs indicative of a sensed magnetic flux, iterating through a set of frequencies, and identifying the marker resonant frequency based upon the multiple sets of plurality inputs. The identifying of the marker resonant frequency includes using a frequency and ring time control processor. Independent claim 11 and dependent claims thereof recite an apparatus for determining a marker resonant frequency of a marker associated with a patient including applying an excitation to the marker, receiving a plurality of inputs indicative of a sensed magnetic flux, iterating through a set of frequencies and a means for identifying the marker resonant frequency based on multiple sets of plurality of inputs. The means for identifying the marker further include a resonant frequency and ring time control processor.

2. Independent Claim 16 Is Directed to a System for Locating a Marker that Includes, *Inter Alia*, a Receiver that Includes a Ring Time Control Processor

Claim 16 recites a system for locating a marker associated with a patient that includes, *inter alia*, a receiver for analyzing a plurality of inputs to remove noise from the plurality of inputs, wherein the receiver includes a ring time control processor that allows

the adjustment of the interval of an observation interval. Various marker designs may have varying ring times. (Specification, page 17) For example, some markers made from certain materials may have ring times that extinguish quite rapidly compared to other markers made of differing material. Due to the varying ring times, it may be advantageous to adjust the excitation pulse interval and the observation interval. Thus, as disclosed and claimed, the receiver has control circuitry that can control the operation of the excitation source in the time domain and a resonant frequency and ring time control processor to provide such modification of the length of the observation interval.

3. Independent Claims 19 and 23 Are Directed to a System and Method for Locating a Marker that Include, *Inter Alia*, a Receiver that Window Filters a Plurality of Inputs

Claim 19 recites a system for locating a marker associated with a subject that includes, *inter alia*, a receiver that window filters a plurality of inputs. Claim 23 recites a method for locating a marker that comprises, *inter alia*, providing a receiver that window filters a plurality of inputs. Applying a window filter, for example, includes signal processing that uses a weighting of the data obtained during the observation interval. (Specification, page 18) In one embodiment, the window can be a Blackman window, which improves the frequency selectivity of the receiver. In another embodiment, the window is a "matched filter" that has a window that emulates the decay signature of the marker resonance. The effect of the matched filter windowing is to improve the sensitivity of the receiver.

4. Claims 6-15 Are Allowable Over Paradiso Because This Reference Does Not Disclose Determining a Marker Resonant Frequency by Adjusting an Excitation Source; Utilizing a Resonant Frequency; and/or Using a Ring Time Control Processor

Claims 1-27 and 32-38 are patentable over Paradiso under Section 102(b) and also under Section 103(a) because this reference fails to teach or disclose a method for determining the resonant frequency of a marker by utilizing a resonant frequency, adjusting an excitation source and/or ring time control processor. As described previously, independent claim 6 recites a method of determining a marker resonant frequency of a marker which includes, *inter alia*, identifying a marker resonant frequency based upon the multiple sets of plurality of inputs, wherein a resonant frequency and ring time control processor is used to identify the marker resonant frequency based upon the multiple sets of plurality of inputs. Independent claim 11, as amended, recites an apparatus for determining a marker resonant frequency of a marker that includes, *inter alia*, means for identifying a marker resonant frequency based upon the multiple sets of plurality of inputs, which further comprise a resonant frequency and ring time control processor. Paradiso does not disclose, teach, or suggest the use of a resonant frequency and ring time control processor to determine resonant frequencies of markers.

Furthermore, none of the secondary references correct the noted deficiencies of Paradiso. For example, none of the secondary references cited by the Examiner teach or disclose adjusting the excitation source to provide further excitation at the marker resonant frequency. Additionally, none of the secondary references teach or disclose receiving a resonance set of plurality of inputs indicative of a sensed magnetic flux induced by the marker in response to the excitation at the marker resonant frequency. Furthermore, the Examiner has not identified any reference that teaches or discloses adjusting the excitation source, therefore, for at least the foregoing reasons, applicants respectfully request that the rejection of all claims under Section 102 and Section 103 be withdrawn.

B. Conclusion

In view of the foregoing, the pending claims, comply with 35 U.S.C. § 112 and are patentable over the prior art. Applicant respectfully requests reconsideration of the application and a mailing of a Notice of Allowance. If the Examiner has any questions or believes a telephone conference would expedite prosecution of this application, the Examiner is encouraged to call the undersigned at (206) 359-6088. The Commissioner is authorized to change any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 50-0665, under Order No. 341148021US from which the undersigned is authorized to draw.

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Respectfully submitted,

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